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Studies on Mesostigmatid Mites Parasitic on Mammals and Birds in Japan

V. Mites of the Genus *Eulaelaps* BERLESE, 1903 (Haemogamasidae)

By

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(Communicated by Yoshinori IMAIZUMI)

The mites of the genus *Eulaelaps* BERLESE occur very commonly on mammals and in nests of some birds in Japan. These mites had been lumped under *Eulaelaps stabularis* (KOCH, 1839) until the present author (1970) pointed out that not all the *Eulaelaps* mites distributed in Japan were conspecific, and that different froms had respective habitat preferences. The present author (1970) recognized three forms at first, and then, added further two valid but anonymous species in 1976. Although the strict habitat preference of each form had been noticed, he (1976) still identified a form found on some small mammals in Japan with *E. stabularis* (KOCH). Recently, a thorough study on *Eulaelaps* mites from straw at Holm near Wedel, West Germany, was made, and a strict definition of the true *Eulaelaps stabularis* (KOCH) has been presented (UCHIKAWA & RACK, in print). As a result of comparative examinations of Japanese specimens, it was confirmed that all the five species in UCHIKAWA (1976) were distinctive, and that *E. stabularis* (KOCH) was not included among them. The following are the descriptions of these five new taxa.

I. *Eulaelaps* Associated with Mammals

1. ***Eulaelaps herbosalis*** sp. nov.

[Japanese name: Sôchi-kinuge-dani]

(Figs. 1–5, A)

Eulaelaps stabularis: UCHIKAWA, 1970, Proc. West Reg. Meeting Jap. Soc. sanit. Zool., 16; 1971, Fuji-san, 852; 1976, Jap. J. sanit. Zool., **27**: 72.

A form of *Eulaelaps stabularis*: UCHIKAWA & ITOH, 1970, Annual Rept. Nagoya City Hlth Res. Inst., **17**: 62, 68, photo. 4.

Female (Figs. 1–2, A). Measurements are based on 10 specimens and presented as means followed by ranges in parentheses.

Gnathosoma. Cheliceral segments I, 100.3 (98–103) μ, and II, 152.4 (145–160) μ; movable digit 73.6 (60–80) μ. Deutosternum (=capitural groove) with 10–11 rows of denticles; each row consisting of 4–5 denticles. Postero-external rostral setae 69.3 (66–73) μ apart; capitural setae 87.0 (80–93) μ apart. Epistome with about

6 conspicuous, branched processes. Corniculi 64.3 (62–66) μ long.

Idiosoma (Figs. 1–2, A). Length 1059.5 (980–1105) μ; width 776.0 (730–810) μ. Dorsal shield 1042.5 (960–1075) μ long by 738.0 (690–780) μ wide, reticulated with irregular lines, heavily covered with smooth setae; a few postero-marginal setae very weakly serrated. Tritosternum with base, 49.6 (48–53) μ, and laciniae, 169.0 (160–175) μ. Sternal shield 122.8 (113–125) μ long by 177.3 (165–185) μ wide at level of setae st_2; setae st_1 115.2 (108–120) μ apart; distance between st_1 and st_3 130.1 (123–137) μ. Genito-ventral shield with a pair of conspicuous lateral incisions posterior to genital setae; maximum width 579.5 (550–620) μ; striae on opisthogastric region complicated as in Fig. 1A, 4; a pair of minute pores on shield just anterior to incisions; opisthogastric setae 90.4 (80–100) μ. Metapodal shield close to genito-ventral shield. Anal shield 73.8 (60–90) μ long by 292.7 (270–305) μ wide; paranal setae 92.5 (85–103) μ and postanal seta 80.8 (68–90) μ. Peritreme extending to posterior third of coxa I; peritrematal shield truncated posteriorly; post-stigmatal pore (=posterior pore throughout present text) large.

Legs. Hypertrophy of ventral setae on leg II not prominent. Average length/width in microns of leg segments:

	I	II	III	IV
genu	144.8/69.0	129.0/85.0	104.4/68.6	148.6/60.0
tibia	161.0/61.0	121.0/74.0	105.4/63.4	150.8/56.4
tarsus	231.0/55.6	164.8/56.2	187.6/53.8	265.8/49.0

Male (Figs. 3–5, A). Two specimens are available.

Gnathosoma. Cheliceral segments I, 70–70 μ, and II, 113–118 μ; movable digit 85–88 μ; spermadactyl surpassing tip of movable digit. Deutosternum with 11 rows of denticles. Postero-external rostral setae 60 μ apart and capitural setae 65 μ apart. Corniculi 58 μ long. Epistome as in female, but marginal processes weak.

Idiosoma. Length 820–840 μ; width 490–560 μ. Dorsal shield covering whole dorsum. Tritosternum with base, 28 μ, and laciniae, 138–150 μ. Holoventral shield (Fig. 4, A) 590–660 μ long by 440–485 μ wide, broadly rounded posteriorly, bearing 65–67 opisthogastric setae. Peritrematal shield, peritreme and posterior pore as in female.

Legs. Ventral setae on leg II as in Fig. 5, A. Length/width in microns of leg segments:

	I	II	III	IV
genu	125.0/52.5	111.5/76.5	85.0/60.0	116.5/51.5
tibia	136.5/49.0	97.5/64.0	84.0/53.5	119.0/46.5
tarsus	198.0/44.5	127.5/48.0	140.5/45.0	206.5/40.5

Material examined. Holotype female and 3 paratype females ex *Microtus montebelli*, Kirigamine, Nagano Prefecture, 31. X. 1968. Allotype male and a para-

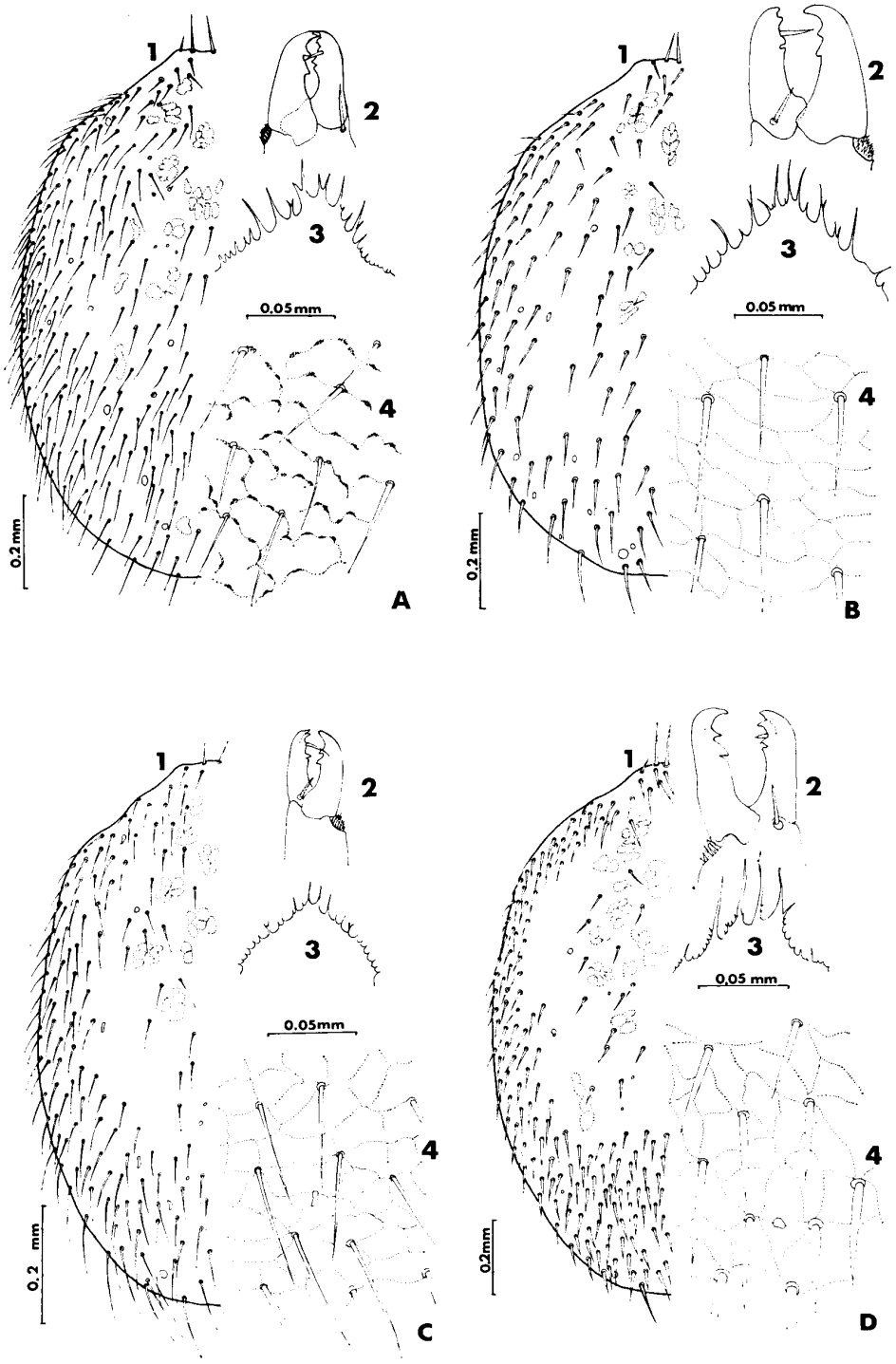

Fig. 1. *Eulaelaps herbosalis* sp. nov. (A), *Eulaelaps vulgaris* sp. nov. (B), *Eulaelaps silvaticus* sp. nov. (C) and *Eulaelaps arboricola* sp. nov. (D), female. —— 1, Dorsal shield; 2, chelae; 3, epistome; 4, striation on genito-ventral shield.

type male ex *Urotrichus talpoides*, Hakuba Village, Nagano Prefecture, 7. IX. 1971. One female each from following hosts taken at Hakuba Village: *M. montebelli*, 4. V.

1971; *Apodemus speciosus*, 6. V. 1971 and 7. IX. 1971. Three females ex *A. speciosus*, Mt. Fuji, Yamanashi Prefecture, 2 (1 example) and 6 (2). VII. 1969. One female ex *Apodemus giliacus*, Hokkaido, 20. IX. 1974. Two females ex *Rattus norvegicus*, Nagoya City, VII. 1969.

The following specimens were examined through the courtesy of Dr. Zenemon ONO: 7 females ex *A. speciosus ainu*, Maruyama, Sapporo, Hokkaido, 20. IX. 1962; 5 females ex *A. speciosus ainu*, Moiwa, Sapporo, VII (3 examples), 21. VIII (1) and 21. IX (1) in 1962; 22 females ex *Clethrionomys rufocanus bedfordiae*, Higashikawa, Kamikawa-shichô, Hokkaido; a female ex *A. speciosus*, 20. IV. 1970, Yakushima, Kagoshima Prefecture (coll. T. KOBAYASHI).

The holotype female and allotype male (NSMT-Ac 9055, 9056) are deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo, and the others in the collection of the author.

2. ***Eulaelaps vulgaris*** sp. nov.

[Japanese name: Nami-kinuge-dani]

(Figs. 1–5, B)

Eulaelaps sp. 2: UCHIKAWA, 1970, Proc. West Reg. Meeting Jap. Soc. sanit. Zool., 16; 1976, Jap. J. sanit. Zool., **27**: 72.
Eulaelaps stabularis group: UCHIKAWA, 1971, Fuji-san, 852.
Eulaelaps stabularis: UCHIKAWA, 1969, Annual Rept. JIBP/CT, 28; 1973, Jap. J. sanit. Zool., **23**: 264.
——MIYAO, 1972, Annual Rept. JIBP/CT, 17.

Female (Figs. 1–2, B). Measurements are based on 10 specimens.

Gnathosoma. Cheliceral segments I, 105.1 (100–110) μ, and II, 149.9 (140–163) μ; movable digit 78.3 (70–83) μ. Deutosternum with 11–12 rows of denticles. Postero-external rostral setae 84.0 (75–95) μ apart; capitural setae 117.7 (104–125) μ apart. Epistome with well developed, branched processes. Corniculi 61.3 (50–68) μ.

Idiosoma. Length 1118.0 (1060–1210) μ; width 862.5 (810–935) μ. Dorsal shield 1094.5 (1040–1190) μ long by 829.0 (780–900) μ wide, covered rather sparsely with coarse setae (ca. 200 in number); some postero-marginal setae serrated. Tritosternum with base, 54.3 (48–60) μ, and laciniae, 204.1 (190–218) μ. Sternal shield 137.5 (130–150) μ apart; distance between st_1 and st_3 153.8 (140–167) μ. Genitoventral shield with lateral depressions posterior to genital setae (among many specimens, an example with a pair of weak invaginations was detected); maximum width 577.0 (550–630) μ; opisthogastric setae sparse, numbering 32.8 (27–44). A pair of small circles laterad from depressions off shield. Anal shield 100.3 (93–110) μ long by 265.0 (250–293) μ wide; paranal setae 91.8 (89–100) μ and postanal seta 65.2 (55–75) μ long. Peritreme extending to posterior third of coxa I; peritrematal shield truncated posteriorly; posterior pore very large.

Legs. Leg setae rather coarse. Some ventral setae slightly thickened. Average length/width in microns of leg segments:

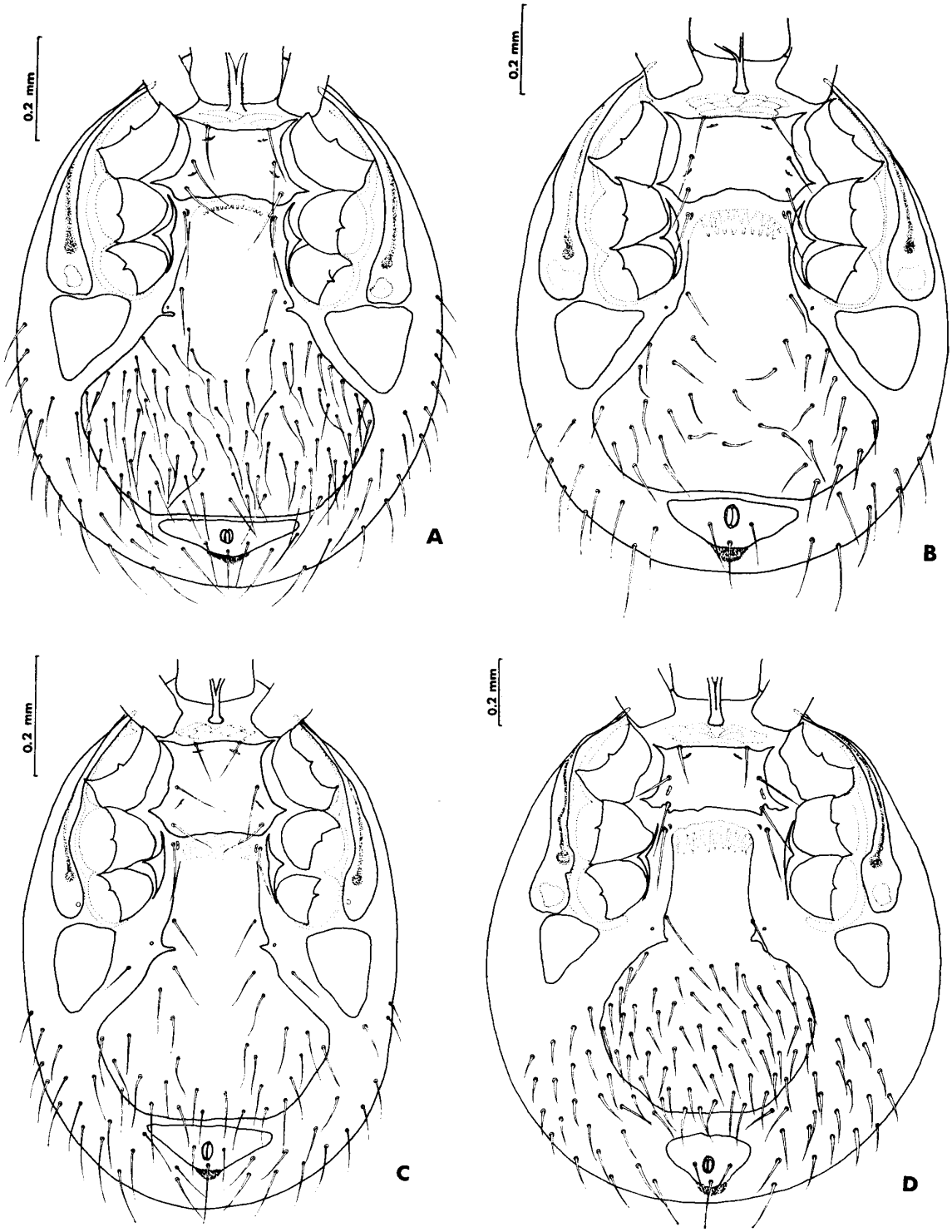

Fig. 2. *Eulaelaps herbosalis* sp. nov. (A), *Eulaelaps vulgaris* sp. nov. (B), *Eulaelaps silvaticus* sp. nov. (C) and *Eulaelaps arboricola* sp. nov. (D), female. Venter.

	I	II	III	IV
genu	153.6/77.6	134.6/90.0	120.8/74.3	157.8/67.9
tibia	172.9/72.4	124.2/78.1	120.7/69.7	159.2/61.2
tarsus	241.8/66.9	180.3/62.3	208.6/59.1	274.9/56.4

Male (Figs. 3–5, B). Three specimens are available, and measurements are taken from two of them.

Gnathosoma. Cheliceral segments I, 80–83 μ, and II, 120–120 μ; movable digit 80–88 μ. Deutosternum with 10–12 rows of denticles. Postero-external rostral setae 75–80 μ apart; capitural setae 83–85 μ apart. Corniculi 55–56 μ long. Epistome as in female.

Idiosoma. Length 820–840 μ; width 490–560 μ. Dorsal shield covering whole dorsum; setae sparse. Tritosternum with base, 48–48 μ, and laciniae, 143–163 μ. Holoventral shield 720–730 μ long by 510–550 μ wide; opisthogastric setae 15, 15 and 22, respectively, on 3 specimens; paranal setae 65 μ and postanal seta 45–47 μ long. Peritrematal shield and posterior pore as in female.

Legs. Average length/width in microns of leg segments:

	I	II	III	IV
genu	150.0/67.5	131.5/81.5	117.5/66.5	152.0/58.0
tibia	162.5/59.0	117.5/73.0	112.5/62.5	145.5/53.0
tarsus	220.0/51.5	145.0/52.5	172.5/50.0	233.0/46.5

Material examined. Holotype female and a paratype female ex *Apodemus argenteus*, Mt. Fuji, Yamanashi Prefecture, 4. VII. 1969. Allotype male and 2 paratype females ex *Apodemus speciosus*, Mt. Kirishima, Kyushu, VII. 1971. A paratype male and 2 females ex *A. argenteus*, Kamikôchi, Nagano Prefecture, VI. 1972. A paratype male and 2 females ex *A. argenteus*, Happo-one, Nagano Prefecture, 18. VIII. 1974. Two females ex *A. argenteus*, Mt. Ishizuchi, Shikoku, IX. 1969. Besides the above measured specimens, a number of females were taken from mice, voles and dormouse throughout Japan.

The holotype female and allotype male (NSMT–Ac 9057, 9058) are deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo, and the others in the collection of the author.

3. ***Eulaelaps silvaticus*** sp. nov.

[Japanese name: Mori-kinuge-dani]

(Figs. 1–5, C)

Eulaelaps sp. 1: UCHIKAWA, 1970, Proc. West Reg. Meeting Jap. Soc. sanit. Zool., 16; 1976, Jap. J. sanit. Zool., **27**: 72.
Eulaelaps stabularis group: UCHIKAWA, 1971, Fuji-san, 825.

Female (Figs. 1–2, C). Measurements are based on 10 specimens.

Gnathosoma. Cheliceral segments I, 70.9 (68–75) μ, and II, 122.9 (115–128) μ; movable digit 59.0 (54–63) μ. Deutosternum with 9–10 rows of denticles. Postero-external rostral setae 51.6 (50–54) μ apart; capitural setae 66.7 (55–75) μ apart. Epistome with short, delicate processes. Corniculi 52.1 (48–56) μ long.

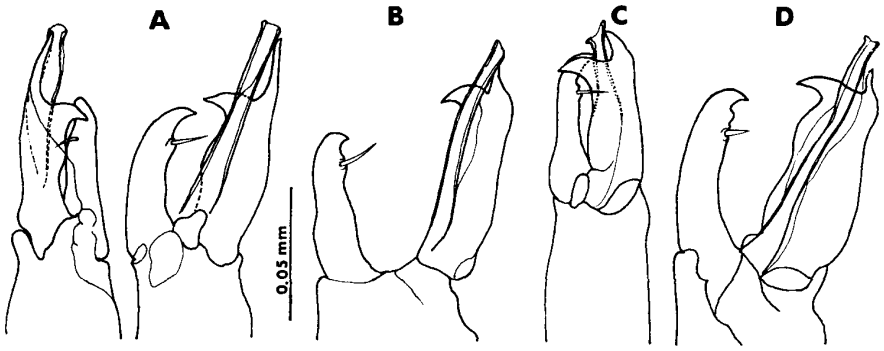

Fig. 3. *Eulaelaps herbosalis* sp. nov. (A), *Eulaelaps vulgaris* sp. nov. (B), *Eulaelaps silvaticus* sp. nov. (C) and *Eulaelaps arboricola* sp. nov. (D), male. Chelae and spermadactyl; A–D in the same scale.

Idiosoma. Length 828.0 (755–902) μ; width 538.9 (480–590)μ. Dorsal shield 822.2 (750–900) μ long by 530.0 (475–575) μ wide, covering almost whole dorsum, bearing fine, smooth setae. Tritosternum with base, 40.3 (38–45) μ, and laciniae, 139.0 (130–150) μ. Sternal shield 147.8 (138–155) μ long by 140.6 (125–150) μ wide, very slightly longer than wide; setae st_1 75.0 (70–80) μ apart; distance between st_1 and st_3 133.0 (130–138) μ. Genito-ventral shield with lateral incisions posterior to genital setae, bearing 34.4 (28–40) opisthogastric setae; maximum width 358.5 (330–400) μ. A pair of small circles laterad from incisions off the shield. A pair of setae between genito-ventral and metapodal shields. Anal shield 77.1 (70–88) μ long and 191.1 (178–208) μ wide; paranal setae 69.0 (65–75) μ and postanal seta 81.9 (78–85) μ long. Peritreme extending to posterior third of coxa I; posterior pore small.

Legs. Leg setae fine. Average length/width in microns of leg segments:

	I	II	III	IV
genu	105.8/57.8	94.6/74.4	73.6/51.2	92.6/42.4
tibia	113.6/49.2	84.6/62.4	67.2/48.8	92.6/41.4
tarsus	175.6/46.6	124.8/47.0	124.2/40.6	178.4/38.0

Male (Figs. 3–5, C). Three specimens are available and measured.

Gnathosoma. Cheliceral segments I, 48, 50 and 52 μ, and II, 103, 105 and 108 μ; movable digit, 65, 65 and 68 μ. Deutosternum with 9–10 rows of denticles. Postero-external rostral setae 48, 53 and 53 μ apart; capitural setae 52, 55 and 55 μ apart. Corniculi 55, 57 and 60 μ long. Epistome as in female.

Idiosoma. Length 672, 675 and 710 μ; width 400, 435 and 475 μ. Dorsal

shield covering almost whole dorsum. Tritosternum with base, 30, 33 and 35 μ, and laciniae, 120–120 μ. Holoventral shield 525, 565 and 590 μ long by 350, 353 and 382 μ wide, bearing 36, 38 and 38 μ opisthogastric setae. Paranal setae 58–60 and postanal seta 63–70 μ long. Peritreme and posterior pore as in female.

Legs. Setae fine. Average length/width in microns of leg segments:

	I	II	III	IV
genu	98.7/52.7	83.3/68.0	69.3/50.3	87.7/39.3
tibia	104.3/46.0	76.7/57.3	62.0/45.3	87.7/37.0
tarsus	161.0/39.3	104.3/41.0	104.3/36.7	152.7/33.7

Material examined. Holotype female, allotype male, 2 paratype females and a female ex *Eothenomys smithi*, Mt. Fuji, Yamanashi Prefecture, 9～11. XI. 1968. Two paratype males and 8 females from the same host and locality, 4～5. VII. 1969. A female from the same host, Tobira, Matsumoto, Nagano Prefecture, 24. X. 1974 (coll. Y. YANAGIDAIRA). A female ex *Apodemus speciosus ainu*, Karikachi Pass, Hokkaido (coll. Z. ONO).

The holotype female and allotype male (NSMT–Ac 9053, 9054) are deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo, and the others in the collection of the author.

4. ***Eulaelaps arboricola*** sp. nov.

[Japanese name: Musasabi-kinuge-dani]

(Figs. 1–5, D)

Eulaelaps mite infesting *Petaurista leucogenys*: UCHIKAWA, 1976, Jap. J. sanit. Zool., **27**: 72.

Female (Figs. 1–2, D). Measurements are based on 10 specimens.

Gnathosoma. Cheliceral segments I, 127.6 (120–140) μ, and II, 162.3 (155–170) μ; movable digit 90.2 (83–93) μ; pilus dentilis minute. Deutosternum with 12 rows of denticles. Postero-external rostral setae 108.1 (105–113) μ apart; capitural setae 121.7 (107–133) μ apart. Epistome with 4 prominent processes. Corniculi 71.8 (68–73) μ long.

Idiosoma. Length 1481.0 (1400–1535) μ; width 1128.4 (1050–1364) μ. Dorsal shield 1387.0 (1300–1400) μ long by 920.0 (900–965) μ wide, heavily covered with strong setae marginally; some postero-marginal setae long and weakly serrated. Tritosternum with base, 55.2 (52–60) μ, and laciniae, 194.3 (183–208) μ. Sternal shield 152.5 (148–163) μ long by 270.8 (258–285) μ wide, granular and weakly reticulated, eroded postero-laterally; posterior margin irregularly demarcated; setae st_1 170.8 (160–180) μ apart; distance between st_1 and st_3 161.0 (148–168) μ. Genito-ventral shield with a pair of weak invaginations or depressions posterior to genital setae; opisthogastric region subcircular with maximum width of 596.5 (555–630) μ and with 71.3 (62–75) strong setae. Metapodal shields relatively small and spaced apart from genito-ventral shield; setae lacking between metapodal and genito-ventral shields. Anal shield

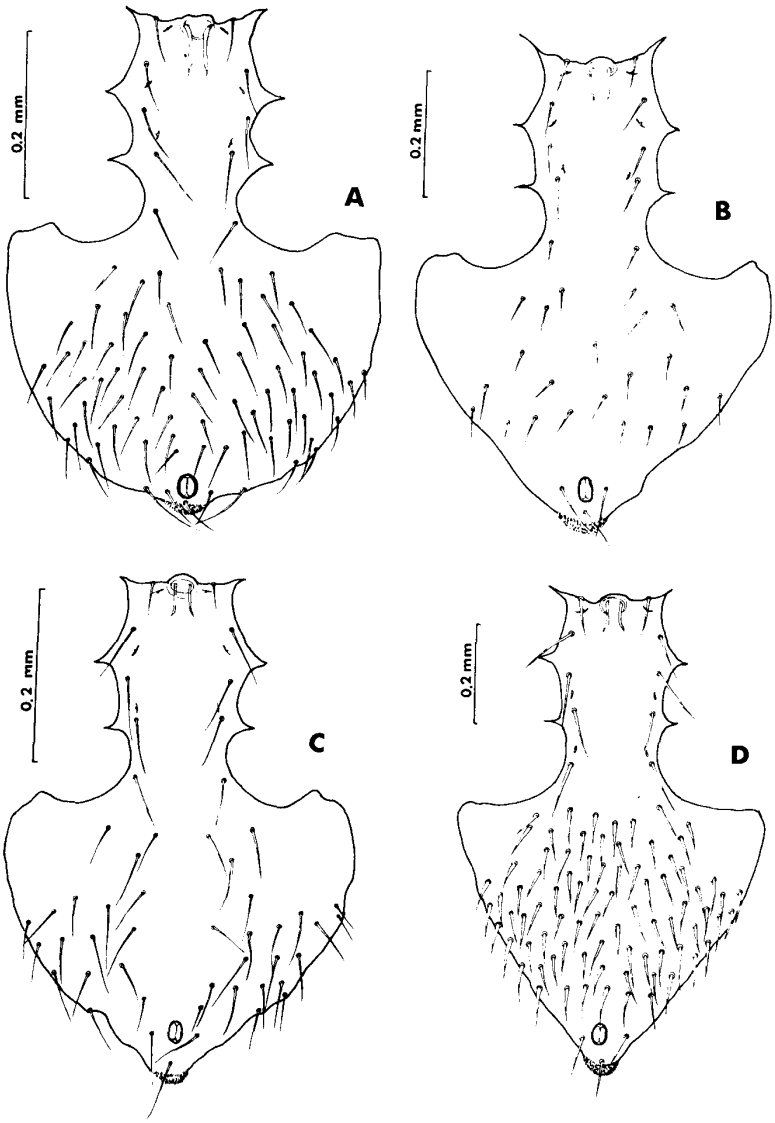

Fig. 4. *Eulaelaps herbosalis* sp. nov. (A), *Eulaelaps vulgaris* sp. nov. (B), *Eulaelaps silvaticus* sp. nov. (C) and *Eulaelaps arboricola* sp. nov., male. Holoventral shield.

136.8 (125–145) μ long by 226.1 (208–243) μ wide; paranal setae 103.7 (98–110) μ and postanal seta 92.0 (90–98) μ. Peritreme ending at middle of coxa II; posterior pore large.

LEGS. Hypertrophy of some ventral setae prominent. Tarsus I very short. Average length/width in microns of leg segments:

	I	II	III	IV
genu	153.2/89.0	143.2/108.6	106.4/83.2	154.4/81.2
tibia	143.2/74.2	118.0/93.2	103.2/76.4	152.0/70.2
tarsus	161.8/60.0	170.6/68.2	179.4/62.0	284.0/61.2

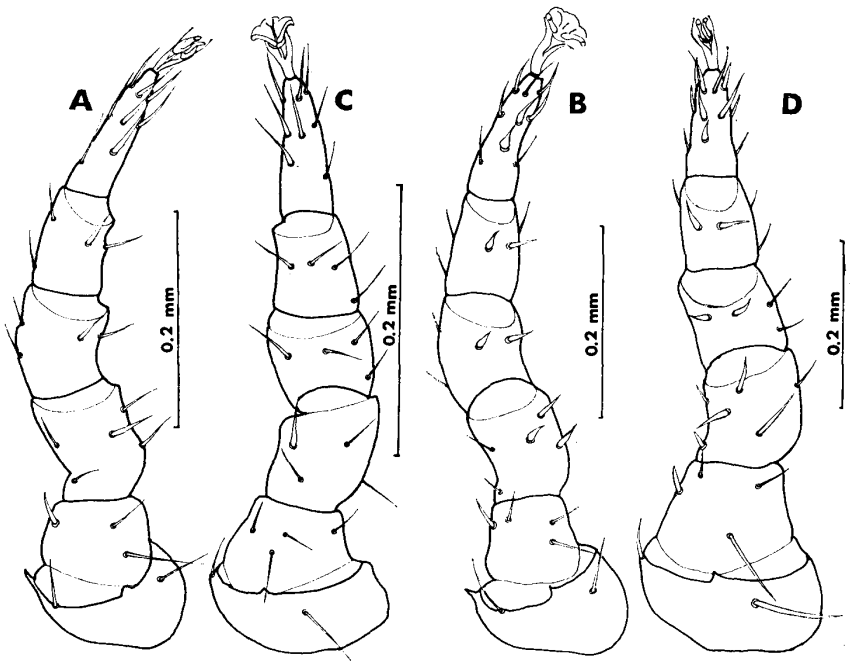

Fig. 5. *Eulaelaps herbosalis* sp. nov. (A), *Eulaelaps vulgaris* sp. nov. (B), *Eulaelaps silvaticus* sp. nov. (C) and *Eulaelaps arboricola* sp. nov., male. Ventral view of leg II.

Male (Figs. 3–5, D). Measurements are based on 10 specimens.

Gnathosoma. Cheliceral segments I, 106.3 (103–115) μ, and II, 135.0 (125–145) μ; movable digit 89.7 (83–95) μ. Deutosternum with 12–13 rows of denticles. Postero-external rostral setae 95.1 (88–100) μ apart; capitural setae 108.6 (95–102) μ apart. Corniculi 68.8 (65–73) μ long. Epistome as in female.

Idiosoma. Length 1216.0 (1190–1240) μ; width 776.0 (750–800) μ. Dorsal shield 1194.0 (1150–1230) μ long by 776.0 (750–800) μ wide. Tritosternum with base, 42.9 (38–48) μ, and laciniae, 148.5 (133–155) μ. Holoventral shield 948.0 (910–980) μ by 642.0 (610–680) μ wide; opisthogastric and anal regions triangular; 84.2 (77–95) opisthogastric setae present. Paranal setae 85.8 (75–95) μ and postanal seta 75.8 (65–83) μ long. Peritreme and posterior pore as in female.

Legs. Leg setae, inclusive of dorsal ones, rather stout. Ventral setae on leg II as in Fig. 5, D. Average length/width in microns of leg segments:

	I	II	III	IV
genu	139.0/79.4	139.6/101.2	102.6/84.8	144.2/78.8
tibia	129.2/67.2	114.6/ 88.0	96.4/79.2	139.4/65.0
tarsus	148.2/53.2	136.2/ 59.0	154.2/58.0	233.2/54.4

Material examined. Holotype female, allotype male, 5 pairs of male and female paratypes, 62 males, 648 females and 10 larvae ex *Petaurista leucogenys* shot at Shinshû-Shinmachi, Nagano Prefecture, 2. I. 1975.

The holotype female and allotype male in alcohol are deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo (NSMT-Ac 9023, 9024), and all the paratypes in the collection of the author.

II. *Eulaelaps* Associated with Birds

5. *Eulaelaps hirundinis* sp. nov.

[Japanese name: Tsubame-kinuge-dani]

(Figs. 6–7)

Eulaelaps mite infesting the nests of *Delichon urbica*: UCHIKAWA, 1976, Jap. J. sanit. Zool., **27**: 72.

Female (Fig. 6). Measurements are based on 10 specimens.

Gnathosoma. Cheliceral segments I, 92.9 (85–100) μ, and II, 136.5 (130–143) μ; movable digit 70.9 (65–73) μ. Deutosternum with 10 rows of denticles. Postero-external rostral setae 72.2 (70–75) μ apart; capitural setae 96.5 (90–103) μ apart. Epistome with about 7 rather simple processes. Corniculi 60.0 (52–65) μ long.

Idiosoma. Length 960.5 (930–990) μ; width 624.0 (590–680) μ. Dorsal shield 951.0 (920–980) μ long by 603.0 (580–620) μ, granular and reticulated, and covered with smooth setae. Tritosternum with base, 53.9 (48–55) μ, and laciniae, 164.4 (160–173) μ. Sternal shield 115.3 (110–120) μ long by 185.0 (180–193) μ wide; pos-

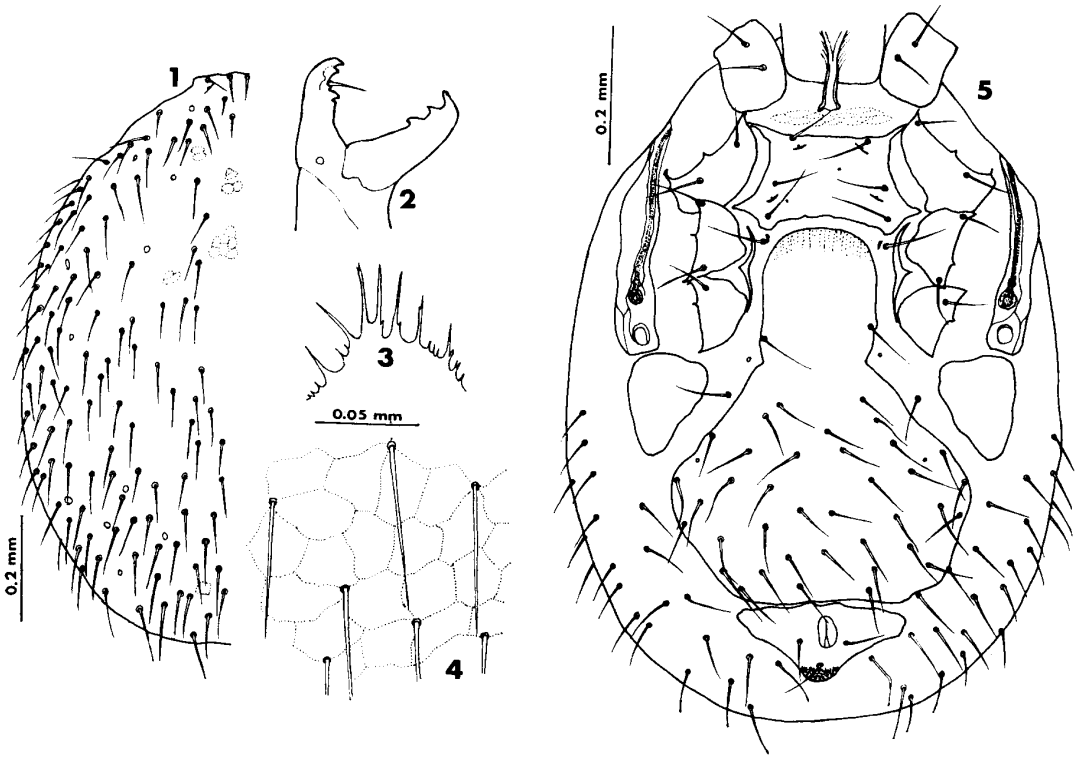

Fig. 6. *Eulaelaps hirundinis* sp. nov., female. —— 1, Dorsal shield; 2, chelae; 3, epistome; 4, striation of genito-ventral shield.

terior margin distinctly concave; setae st_1 110.4 (103–120) μ apart; distance between st_1 and st_3 122.5 (120–128) μ. Genito-ventral shield with lateral depressions posterior to genital setae; maximum width 418.0 (390–440) μ; striae on postero-lateral portion as in Figs. 5, 4; 37.6 (31–45) opisthogastric setae present. A pair of small circles slightly antero-laterad from lateral depressions off genito-ventral shield. A pair of setae present on soft cuticle between genito-ventral and metapodal shields. Anal shield 102.5 (98–113) μ long by 227 (200–243) μ wide; paranal setae 71.9 (68–75) μ, and postanal seta 62.9 (60–65) μ long. Peritreme short and terminating at middle of coxa II; peritrematal shield slightly swollen and truncated posteriorly; posterior pore large.

Legs. Hypertrophy of ventral setae on distal segments of legs II, III and IV weak. Average length/width in microns of leg segments:

	I	II	III	IV
genu	130.6/56.6	114.2/74.0	94.4/54.6	131.8/52.6
tibia	139.8/50.2	106.8/63.4	94.4/51.2	135.2/47.8
tarsus	213.2/44.6	155.6/50.0	168.0/44.2	248.4/44.8

Male (Fig. 7). Only a single specimen is available.

Gnathosoma. Cheliceral segments I, 75 μ, and II, 115 μ; movable digit 58 μ; spermadactyl distinctly surpassing tip of movable digit. Deutosternum with 10 rows of denticles. Postero-external rostal setae 65 μ apart; capitural setae 75 μ apart. Corniculi 60 μ. Epistome as in female.

Idiosoma. Length 780 μ; width 510 μ. Dorsal shield covering whole dorsum. Tritosternum with base, 40 μ, and laciniae, 115 μ. Holoventral shield 640 μ long by 400 μ wide, bearing 38 opisthogastric setae. Setae st_1 93 μ apart; distance between st_1 and st_3 115 μ. Paranal setae 53 μ and postanal seta 45 μ long. Peritreme and posterior pore as in female.

Legs. Ventral setae on leg II as in Fig. 7. Length/width in microns of leg segments:

	I	II	III	IV
genu	128/56	103/73	90/57	128/50
tibia	133/50	95/58	90/50	128/45
tarsus	195/38	140/45	153/40	220/38

Material examined. Holotype female, 5 paratype females and 25 females from nests of *Delichon urbica*, Otari Village, Nagano Prefecture, 6. IX. 1975. Allotype male and 3 females from the above site, 12. VI. 1977. Twelve females from nests of *D. urbica* in Hokkaido (coll. Z. ONO). The holotype female and allotype male (NSMT–Ac 9025, 9026) are deposited in the collection of the National Science Museum (Nat. Hist.), Tokyo, and the other specimens of the type-series in the collection of the author.

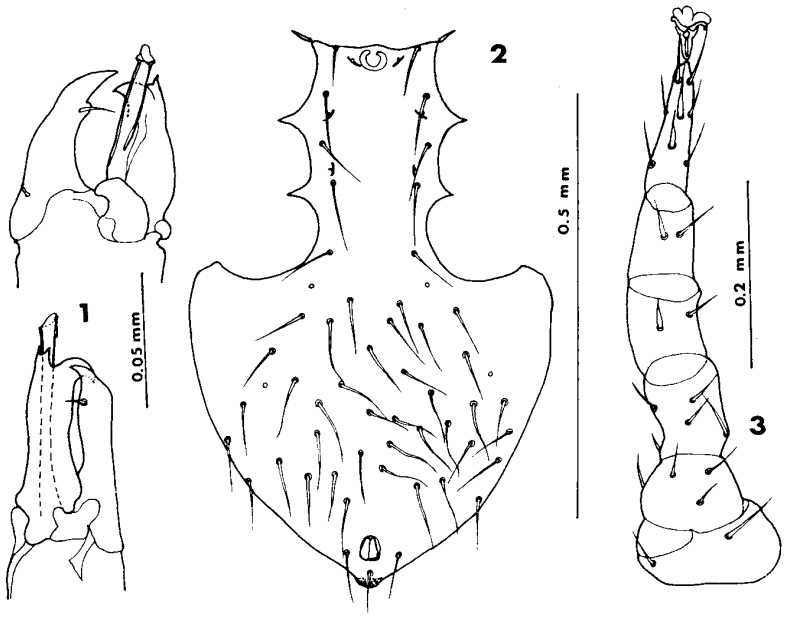

Fig. 7. *Eulaelaps hirundinis* sp. nov., male. —— 1, Chelae and spermadactyl; 2, holoventral shield; 3, ventral view of leg II.

6. ***Eulaelaps*** sp.

Two females collected by Dr. Zenemon ONO from the nests of Leach's fork-tailed petrel, *Oceanodroma leucorhoa*, on Daikoku-jima, Hokkaido, 20. VIII. 1965, were examined. These specimens closely resemble *E. stabularis* (KOCH) and *E. silvaticus* sp. nov., but male specimens are necessary for a definite identification of them.

Discussion

The so-called *Eulaelaps stabularis* (KOCH, 1839) had been a single representative of the genus *Eulaelaps* BERLESE in Japan, since *Eulaelaps ewingi* PEARSE, 1935, described as a parasite of Crustacea from Aburatsubo is not a mite of the family Haemogamasidae. However, not less than five valid species are associated with mammals and birds as described above, and true *E. stabularis* (KOCH) is not included among them.

WEN (1976) has pointed out that the former *E. stabularis* is a species-complex. UCHIKAWA and RACK (in print) considered that ambiguous understandings of *E. stabularis* (KOCH) had introduced a code to accept various forms as *E. stabularis* with a vast intraspecific variation. Thus, certain *E. stabularis* mites of previous authors are hardly separable from the above Japanese species.

The female of *Eulaelaps herbosalis* sp. nov. resembles *E. stabularis* in BAKER *et al.* (1956 and 1958), which was cited in DOMROW (1960) and ASANUMA (1965). It is, however, distinctive in having dense setae and unique striations on the dorsal and genito-ventral shields. The present mite comes out with *E. stabularis* in the key of

ALLRED (1969), which is not *E. stabularis* in the strict sense and may include many valid species. *E. herbosalis* sp. nov. is allied most closely to *E. oudemansi* TURK redescribed by UCHIKAWA and RACK (in print). Both the mites share a remarkable hypertrichy on the idiosoma and peculiar striation on the dorsal and genito-ventral shields, though the structure of the genito-ventral shield is quite different.

Eulaelaps herbosalis sp. nov. is found on small mammals caught exclusively on sunny places such as grasslands and skirts of sparse woods. A few specimens were taken from *Rattus norvegicus* trapped even in a poultry at the suburbs of Nagoya City (UCHIKAWA and ITOH, 1970). Althuogh exact data on habitats of mice and voles that yielded many specimens of this mite in Hokkaido are uncertain, these mammals are known to prevail in grasslands and clearings (TANAKA, 1967).

Eulaelaps vulgaris sp. nov. seems to have been lumped under *E. stabularis* in BREGETOVA (1956), but is distinctive. *E. vulgaris* resembles *E. shanghaiensis* WEN, 1976, from the nest of *Apodemus agrarius* in China. The former, however, bears only half a number of setae on the dorsal, genito-ventral and holoventral shields as compared with those in the latter. *E. vulgaris* occurs very commonly on various small mammals from diverse habitats, exclusive of grasslands and deep coniferous forests, throughout Japan. A majority of mites that have so far been recorded as *E. stabularis* in Japan seem to represent *E. vulgaris.*

Eulaelaps silvaticus sp. nov. is also included in *E. stabularis* in BREGETOVA (1956). The venter (fig. 4) and chelicera (fig. 173) for the male of *E. stabularis* in BREGETOVA (1956) well accord with those of *E. silvaticus.* This species resembles *E. stabularis* (KOCH) in having a very small posterior pore on the peritrematal shield. It is, however, distinctly smaller than *E. stabularis,* and the form of the sternal shield is quite different between the two species. *E. silvaticus* is also allied to *E. jilinensis* WEN, 1976, the female of which was described as a parasite of *Clethrionomys rufocanus* in China. The two species are barely separable by the nature of the setae on leg II, that is, all setae are simple on *E. silvaticus,* while several setae are rabbit-ear-like on *E. jilinensis.*

Eulaelaps silvaticus has thus far been found exclusively on *Eothenomys smithi* trapped in deep coniferous forests in Central Honshu. Only a single female was taken from *A. speciosus ainu* caught in the artificial coniferous forest planted at Karikachi Pass, Hokkaido, in 1912. This forest may be furnished with favourable conditions for host mammals and the mite.

Eulaelaps arboricola sp. nov. is a very large-sized mite, and its ventral shields are reduced in the two sexes. The relatively short tarsi of legs are suggestive of a mode of life different from those of the other species. The mite shares some characteristics with *E. voronovi* PETROVA et TASKAEVA, 1974, parasitic on the squirrel *Dremomys rufigenis* but the size and degree of hypertrichy on the idiosoma differ between the two species. This species has solely been found on the flying squirrel, *Petaurista leucogenys,* that lives in tree holes.

Eulaelaps hirundinis sp. nov. is the second member of the genus *Eulaelaps* infesting bird nests. This mite is strikingly different from the first species, *E. novus* VITZTHUM,

1925, found in the nests of *Riparia riparia*, in having only simple setae ventrally on tarsus II, though the two mites share many characteristics, inclusive of measurements. Nidicolous arthropods such as fleas and ticks are different in the nests of *D. urbica* and *R. riparia* (ONO, 1963, 1964, 1967; UCHIKAWA, 1969 a, 1970 b). This is also the case of the *Eulaelaps* mites.

Eulaelaps sp. from the nests of Leach's fork-tailed petrel, *Oceanodroma leucorhoa*, is remarkably different from the above two bird *Eulaelaps*. This bird builds its nests in deep holes on the slants at the sea shore, and its nest site yields a sea bird flea, *Ceratophyllus hagoromo* (ONO, 1971). This suggests that environmental conditions for nidicolous arthropods furnished with in the nest of *O. leucorhoa* are different from those in the nests of *D. urbica* and *R. riparia*. It is reasonable that *Eulaelaps* mites from the nests of the three birds differ from one another.

The female of *Eulaelaps* sp. resembles those of *E. stabularis* (KOCH) and *E. silvaticus* sp. nov. Standing on the fact that the habitat for *Eulaelaps* sp. is distinctly different from those for the latter two species, this anonymous mite must be identified prudently through the examination of specimens of both the sexes.

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Summary

The five forms of *Eulaelaps* mites so far found on mammals and in bird nests were regarded as valid species and identified. They were *Eulaelaps herbosalis* sp. nov., *Eulaelaps vulgaris* sp. nov., *Eulaelaps silvaticus* sp. nov., *Eulaelaps arboricola* sp. nov. and *Eulaelaps hirundinis* sp. nov. The occurrence of an unidentified species was also recorded. The type-species of the genus, *Eulaelaps stabularis* (KOCH, 1839), has not been taken so far from mammals and birds in Japan, though this mite was previously considered to be a single representative of the genus *Eulaelaps*. Habitat preferences of the above species were noted.

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